

**IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE**

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LEVITATION AND STABILIZING HULL SYSTEM

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1 **I. TITLE: "LEVITATION AND STABILIZING HULL SYSTEM"**

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3 **II. BACKGROUND OF THE INVENTION**

4
5 **1. Field of the Invention.**

6
7 The present invention relates to a stabilizing hull system for boats
8 that improves displacement performance without compromising its at idle
9 stability.

10
11 **2. Description of the Related Art.**

12
13 Many designs for boat hulls have been developed in the past. None
14 of them, however, includes such combination of steps, channels and strakes
15 on the underside of the hull that permit the boat levitate achieving
16 remarkable running stabilization. In the present invention, the
17 longitudinal angles of the strakes are in a disposition with respect to the
18 steps to provide optimal circulation of the air between the bottom and the
19 body of water. The boat's strakes also provide substantial idle stability
20 with the flat horizontal portions adjacent to the plowing fin members.

21
22 Applicant believes that the closest reference corresponds to U.S.
23 patent No. 5,452,676 issued to Fiore on September 26, 1995 for a hull
24 configuration for high-speed boats. Fiore's patented invention includes a
25 V-shaped hull with multiple steps in the fore-and-aft direction in
26 combination with a variable dead rise from keel to chine in the steps
27 providing an increased support of the hull near the chines, and relatively
28 less support near the keel. One of the objects of the Fiore's patented

1 invention is to minimize the running friction between the hull and the
2 water surface and to stabilize the hull at high running speeds. In the Fiore's
3 patent the beam of the hull chine increases from bow to transom providing
4 lateral stability. The combination of multiple steps and variable dead rise
5 provides longitudinal stability. The present invention also provides a hull
6 chine that extends from bow to transom providing lateral stability.
7 However, Fiore's patented invention differs from the present invention
8 because the latter includes a channel adjacent to the steps allowing air to
9 come in forming a cushion that tends to raise the hull, which allows the
10 boat to run with optimum performance.

11
12 Applicant believes that another relevant reference corresponds to
13 U.S. patent No. 5,983,823 issued to Allison on November 16, 1999 for a
14 high-speed sport/utility boat. Allison's patented invention includes a V-
15 bottom hull for sport/utility boats with intermediate lifting strakes along
16 the aft half of the hull bottom positioned laterally along the boat bottom
17 between the planing pad step and the chine. Allison's invention intends to
18 reduce the turning circle executed at high speed. However, Allison's
19 patented invention differs from the present invention because the latter
20 includes at least one pair of strakes with a fin at an angle with respect to
21 the hull V-shape bottom surface and a horizontal longitudinal section next
22 to each strake. Such combination provides an optimal stability whether the
23 boat is anchored or high-speed running and also makes the displacement
24 line of the boat straight.

25
26 Applicant believes that U.S. patent No. 5,476,061 issued to
27 Ackerbloom on October 4, 1994 for a power boat hull may be related.
28 Ackerbloom's patented invention refers to a powerboat hull having an

1 outer running surface that forms a channel with a concave curvature. The
2 Akerbloom's hull design is intended to create a large surface area that
3 comes in contact with the water when the boat is turned. As disclosed in
4 Akerbloom's patent, a problem with large surface areas is that water may
5 hook the bow resulting in a dip or a spin when a boat with a lifting
6 structure at its stern is turned in choppy water. The deep concave channel
7 captures displaced water and directs it to the rear of the boat where the
8 after portion of the channel turns down the water to lift the rear of the boat
9 during takeoff and at moderate boat running speeds. At high speeds, the
10 channel is lifted out of the water so that water passes along the boat. Only
11 when the boat is turned, the channel again becomes effective. However,
12 Akerbloom's invention differs from the present invention because this
13 invention includes the disposition of strakes with fin members at an angle
14 with respect to the hull V-shape bottom surface and a horizontal
15 longitudinal section next to each strake gives stability to the boat even
16 when the boat is running at high speeds.

17
18 None of hulls in the prior art, however, includes a system that
19 provides a stabilized and balanced hull. This reduces the power that is
20 required to propel the boat through the water. In fact, the prior fails to
21 disclose a boat capable of keeping a straight displacement line on the water
22 such as with the present invention. The invention channel in the present
23 application has a channel adjacent to and in a parallel relationship with
24 respect to the transversal steps that allows elevated drive heights keeping
25 the boat stabilized and with more trim leverage. This in turn allows the
26 user to run the boat at any given speed with optimum performance. Also,
27 the present invention provides for at least one pair of strakes with fin
28 members at an angle with respect to the hull V-shaped bottom surface and

1 a horizontal longitudinal section next to each strake. Such combination
2 provides optimal stability and makes the displacement line of the boat
3 straight. Such combination also provides these advantages whether the
4 boat is anchored or running at high-speed.

5
6 Other patents describing the closest subject matter provide for a
7 number of more or less complicated features that fail to solve the problem
8 in an efficient and economical way. None of these patents suggest the
9 novel features of the present invention.

10 11 **III. SUMMARY OF THE INVENTION**

12
13 It is one of the main objects of the present invention to provide a hull
14 for a boat with a combination of steps, channels and strakes on its
15 underside resulting in a boat with optimal stabilization characteristics and
16 better performance.

17
18 It is another object of this invention to provide a hull for a boat that
19 achieves optimal trim leverage and stabilized handling of the boat.

20
21 It is still another object of the present invention to provide minimum
22 transversal oscillation movements and minimum lateral displacement of
23 the boat while cruising.

24
25 It is yet another object of this invention to provide such a hull that is
26 inexpensive to manufacture and maintain while retaining its effectiveness.

1 Further objects of the invention will be brought out in the following
2 part of the specification, wherein detailed description is for the purpose of
3 fully disclosing the invention without placing limitations thereon.
4

5 **IV. BRIEF DESCRIPTION OF THE DRAWINGS**

6

7 With the above and other related objects in view, the invention
8 consists in the details of construction and combination of parts as will be
9 more fully understood from the following description, when read in
10 conjunction with the accompanying drawings in which:
11

12 **Figure 1** represents bottom view of the hull system, object of the
13 present application.
14

15 **Figure 2** is a side elevational view of the boat, showing the steps on
16 the underside of the hull.
17

18 **Figure 3** shows a schematic view of the steps on the underside of the
19 hull for the present invention.
20

21 **Figure 3a** shows a schematic view of the steps on the underside of the
22 hull for the prior art.
23

24 **Figure 4** is a bottom view of the hull for the present invention,
25 showing the intake air flowing through the channels.
26

27 **Figure 4a** is a partial bottom view of the hull for the prior art,
28 showing the direction of the air flowing through the steps.

1 **Figure 5** illustrates a cross-section view take from figure 4 along lines
2 5-5, showing the disposition of the strakes in the present invention.

3
4 **Figure 5a** illustrates a cross-section view take form figure 4a along
5 lines 5a-5a, showing the disposition of the strakes in the prior art.

6
7 **Figure 6** is an enlarged view of one of the strikes taken form figure 5,
8 line 6.

9
10 **V. DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

11
12 Referring now to the drawings, where the present invention is
13 generally referred to with numeral 10, it can be observed that it basically
14 includes hull underside 20, steps 40 and 60 and strakes 70; 80; 90; 170; 180;
15 190; 270; 280; 70'; 80'; 90'; 170'; 180'; 190'; 270' and 280', as seen in figure 1.
16 The cross-sections of the strakes are shown in figure 5B with those of the
17 prior art represented in figure 5A.

18
19 Hull underside 20 has a substantially V-shape cross-section and
20 includes fore section 22, amidships section 24 and aft section 26. Chine 27
21 extends peripherally as the intersection of the bottom and the side of the
22 hull. The cross-section of chine 27 extends substantially vertically and
23 downwardly to plow into the body of water thereby providing stability
24 from lateral movements of the boat. Keel 28, as best seen in figure 1, runs
25 longitudinal from the fore end to the aft end. Sections 22; 24 and 26 are
26 defined by steps 40 and 60.

1 Channels 42 and 62, respectively, running adjacent and in a parallel
2 relationship with respect to transversal corners 41 and 61 of steps 40 and
3 60, as seen in figures 1 and 2. In the preferred embodiment, channels 42
4 and 62 have a relatively small width with respect to the length of steps 40
5 and 60. Good results have been obtained with channels 42 and 62 having
6 approximately 12 cm of width. The water flowing (or the boat sliding over
7 the water) along fore section 22 of hull underside 20 goes to step 40 (and
8 60). An air current is created inside channel 42 (and 62) that tends to lift
9 the boat resulting in better performance, as best seen in figures 3 and 4.
10 The air comes inside channels 42 and 62 through inlets 43 and 63. In the
11 prior art the water goes from one step to the next step, as best seen in figure
12 3a, with a very limited amount of air going through. Steps 40 and 60 in the
13 present invention have a V-shape pointing to the front of the hull, as seen
14 in figure 1. This shape is intended to trap the air coming in from the sides
15 of the boat and direct it towards keel 28 thereby forming an air cushion
16 lifting the boat, as best seen in figure 4. Part of the air trapped in channel
17 42 (and 62) escapes to sections 24 and 26. The faster the boat runs the
18 larger the pressure of the trapped air urging the boat to levitate.

19
20 Strakes 70; 80; 90; 70'; 80' and 90' extend longitudinally from fore to
21 channel 42. Strakes 170; 180; 190; 170'; 180' and 190' extend longitudinally
22 from channel 42 to channel 62. Strakes 270; 280; 270' and 280' extend
23 longitudinally from channel 62 to aft. Strakes 70; 170; 270; 70'; 170' and 270'
24 define chine 27. In section 22 strakes 70; 80; 90; 70'; 80' and 90' run
25 longitudinally to the fore to converge in keel 28. Strakes 70; 80; 90; 170; 180;
26 190; 270; 280; 70'; 80'; 90'; 170'; 180'; 190'; 270' and 280' have a substantially
27 triangular cross-section. Horizontal surfaces 76; 86; 96; 176; 186; 196; 276;
28 286; 76'; 86'; 96'; 176'; 186'; 196'; 276' and 286', respectively, extending

1 longitudinally and are adjacent to strakes 70; 80; 90; 170; 180; 190; 270; 280;
2 70'; 80'; 90'; 170'; 180'; 190'; 270' and 280', as best seen in figure 5. Strakes 70;
3 80; 90; 170; 180; 190; 270; 280; 70'; 80'; 90'; 170'; 180'; 190'; 270' and 280'
4 provide stability to the boat when idle and also at low and high speed.
5 When the water level is under chine 27 (planing) the strakes also provide
6 stability. Horizontal surfaces 76; 86; 96; 176; 186; 196; 276; 286; 76'; 86'; 96';
7 176'; 186'; 196'; 276' and 286' provide stability against bobbin to the boat at
8 any speed.

9
10 The water flowing along the underside 20 is plowed by strakes 70; 80;
11 90; 170; 180; 190; 270; 280; 70'; 80'; 90'; 170'; 180'; 190'; 270' and 280', which
12 point downwardly acting substantially like a fin. This results in a straight
13 line running.

14
15 In the prior art shown in figure 5a, the strakes provide certain bobbin
16 stability while the boat is anchored. However, the strakes have a
17 substantially horizontal surface H that is larger than the vertical surface V.
18 The latter accounts for the limited stability achieved against side
19 movement. But it is not very effective, in particular when planning since it
20 loses the vertical surface of the side S of the boat. In the present invention,
21 the downwardly extending sides 71; 81; 91; 171; 181; 191; 271; 281; 71'; 81';
22 91'; 171'; 181'; 191'; 271' and 281' are relatively larger than the horizontal
23 surfaces 76; 86; 96; 176; 186; 196; 276; 286; 76'; 86'; 96'; 176'; 186'; 196'; 276'
24 and 286'.

25
26 Also, in the present invention front ends 72; 82; 92; 172; 182; 192; 272;
27 282; 72'; 82'; 92'; 172'; 182'; 192'; 272' and 282' of strakes 70; 80; 90; 170; 180;
28 190; 270; 280; 70'; 80'; 90'; 170'; 180'; 190'; 270' and 280' are not squares to

1 facilitate the intake of air trapped in channels 42 and 62 to portions 24 and
2 26, respectively, and also routing the water between contiguous strakes.

3

4 The present invention provides for enhanced stability that prevents
5 side movement while running and vertical stability with the horizontal
6 surfaces.

7

8 The foregoing description conveys the best understanding of the
9 objectives and advantages of the present invention. Different embodiments
10 may be made of the inventive concept of this invention. It is to be
11 understood that all matter disclosed herein is to be interpreted merely as
12 illustrative, and not in a limiting sense.

13